IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): Multi-user detection method with elimination of interference between users, each user transmitting modulated data in the form of symbols on a transmission channel, each transmission channel (k) comprising at least one propagation path (i) and each propagation path arriving at an array of reception antennae (ℓ) according to a direction of arrival ($\theta_{i,k}$), the method comprising at least one sequence of steps for each user (k), wherein each sequence comprises:

(a) a reception step decomposing each antenna signal into filtered signals ($x_{\ell,i,k}$) issuing from different paths (i) of the ~~user~~ transmission channel (k) and combining the filtered signals by scaling the filtered signals with a first plurality of complex coefficients ($b_{\ell,i,k,}c_{i,k}$) in order to form an estimation (z_k) of a signal transmitted by the user;

(b) a step of estimating the contribution ($(x_{\ell,k})\ell$=1..L) , where L is an integer, of the user to the signals received by the array of reception antennae from the estimation of the signal transmitted and a second plurality of complex coefficients ($u_{i,k},\ w_{\ell,i,k}$) obtained from the first plurality of complex coefficients;

(c) a step of eliminating interference by subtracting from the antenna signals the contribution estimated at step (b) in order to obtain cleaned antenna signals;

the cleaned antenna signals supplied by at least one first sequence being used as antenna signals by at least one second sequence.

Claim 2 (Previously Presented): Multi-user detection method according to Claim 1, wherein the first plurality of complex coefficients comprises a first set of complex coefficients ($b_{\ell,i,k}$) and a second set of complex coefficients ($c_{i,k}$) and the filtered signals ($x_{\ell,i,k}$) are subjected to a channel formation step in order to form signals of paths ($y_{i,k}$) by scaling the

path signals with the first set, the path signals then being linearly combined by scaling the path signals with the second set in order to supply the estimation (z_k) of the signal transmitted, the coefficients of the first set being adapted so as to minimise a plurality of first error signals ($\epsilon'_{i,k}$) between a reference value (q_k) of the transmitted signal and the path signals ($y_{i,k}$), the coefficients of the second set being adapted so as to minimise a second error signal (ϵ''_k) between theestimation (z_k) and the reference value.

Claim 3 (Previously Presented): Multi-user detection method according to Claim 2, wherein the second plurality ($w_{\ell,i,k}$, $u_{i,k}$) of coefficients comprises a first set of complex coefficients ($w_{\ell,i,k}$) and a second set of complex coefficients ($u_{i,k}$), the coefficients ($w_{\ell,i,k}$) of the first set of the second plurality being obtained from the arguments of the coefficients ($b_{\ell,i,k}$) of the first set of the first plurality and the coefficients ($u_{i,k}$) of the second set of the second plurality being obtained from coefficients ($c_{i,k}$) of the second set of the first plurality.

Claim 4 (Previously Presented): Multi-user detection method according to Claim 3, wherein the coefficients ($u_{i,k}$) of the second set of the second plurality are obtained by conjugation of the coefficients ($c_{i,k}$) of the second set of the first plurality.

Claim 5 (Previously Presented): Multi-user detection method according to Claim 3 or 4, wherein the coefficients ($w_{\ell,i,k}$) of the first set of the second plurality are obtained from a linear regression on the arguments of the coefficients ($b_{\ell,i,k}$) of the first set of the first plurality.

Claim 6 (Previously Presented): Multi-user detection method according to one of Claims 2 to 4, wherein at the first sequence,

the coefficients ($b_{\ell,i,k}$) of the first set of the first plurality are initialised by $b_{\ell,i,k}(0)=\delta(\ell-\ell o),\forall i$ where δ is the Dirac symbol, ℓo is an antenna number;

andthe coefficients ($c_{i,k}$) of the second set of the first plurality are initialised by $c_{i,k}(0)=c,\forall i$ where c is a given complex coefficient.

Claim 7 (Previously Presented): Multi-user detection method according to one of Claims 2 to 4, wherein at the first sequence,

the coefficients ($b_{\ell,i,k}$) of the first set of the first plurality are initialised by $b_{\ell,i,k}(0)=\exp(-j(\hat{v}_{i,k}(0)+2\pi d/\lambda\cos\hat{\theta}_{i,k}(0).(\ell-1)))$ and the coefficients($c_{i,k}$) of the second set of the first plurality are initialised by $c_{i,k}(0)=\hat{a}_{i,k}(0)$ where $\hat{\theta}_{i,k}(0)$, $\hat{v}_{i,k}(0)$, $\hat{a}_{i,k}(0)$ are respectively estimations of the directions of arrival, phase rotations and coefficients of attenuation for the different paths.

Claim 8 (Previously Presented): Multi-user detection method according to Claim 1, wherein the first plurality of coefficients includes a set of complex coefficients ($b_{\ell,i,k}$) and the filtered signals ($x_{\ell,i,k}$) are linearly combined (520_k) by scaling the filtered signals with said set in order to supply said estimation (z_k) of the signal transmitted, the coefficients of said set being adapted so as to minimise an error signal (ϵ_k) between the estimation (z_k) and a reference value (q_k).

Claim 9 (Previously Presented): Multi-user detection method according to Claim 8, wherein said second plurality ($w_{\ell,i,k}$, $u_{i,k}$) of coefficients comprises a first set of complex

coefficients ($w_{\ell,i,k}$) and a second set of complex coefficients ($u_{i,k}$), the coefficients ($u_{i,k}$) of the second set of the second plurality being obtained by: $u_{i,k}=g_{i,k}/g_k$ where $g_{i,k}$ is an estimation of the norm of the sub-vector $\bar{b}_{i,k} = \begin{pmatrix} b_{1,i,k} \\ b_{2,i,k} \\ \cdot \\ \cdot \\ b_{L,i,k} \end{pmatrix}$, L being the number of antennae in the array, where g_k is a mean of the $g_{i,k}$ values on the different paths, the coefficients ($w_{\ell,i,k}$) of the first set of the second plurality being obtained from the arguments of the coefficients ($b_{\ell,i,k}$) of the set of the first plurality.

Claim 10 (Previously Presented): Multi-user detection method according to Claim 8 or 9, wherein at the first sequence, the coefficients ($b_{\ell,i,k}$) of the set of the first plurality are initialised by $b_{\ell,i,k}(0)=b\cdot\delta(\ell-\ell o),\forall i$ where δ is the Dirac symbol, ℓo is an antenna number and b a given complex coefficient.

Claim 11 (Previously Presented): Multi-user detection method according to Claim 8 or 9, wherein at the first sequence, the coefficients ($b_{\ell,i,k}$) of the set of the first plurality are initialized by $b_{\ell,i,k}(0)=\hat{a}_{i,k}(0).\exp(-j(\hat{v}_{i,k}(0)+2\pi d/\lambda\cos\hat{\theta}_{i,k}(0).(\ell-1)))$ where $\hat{\theta}_{i,k}(0)$, $\hat{v}_{i,k}(0)$, $\hat{a}_{i,k}(0)$ are respectively estimations of the directions of arrival, phase rotations and coefficients of attenuation for the different paths.

Claim 12 (Currently Amended): Multi-user detection method according to one of Claims 1-4 and 8-9, wherein for a given ~~user~~ transmission channel (k), the interference is eliminated by subtracting from the antenna signals of the contributions of all the other users.

Claim 13 (Previously Presented): Multi-user detection method according to Claim 12, wherein each sequence comprises a step of estimating the symbols transmitted from the estimation of the signal transmitted (z_k) in order to obtain first estimated signals ($\hat{s}k$), a step of demodulating the first estimated symbols ($\hat{s}k$) in order to obtain estimated data ($\hat{d}k$), a step of channel decoding of the estimated data followed by a channel recoding and a remodulation in order to obtain second estimated symbols ($\hat{s}'k$).

Claim 14 (Previously Presented): Multi-user detection method according to Claim 2 or 8, wherein the reference value ($q^{(n)}{}_k$) for a transmitted signal, used at the second sequence or at a subsequence sequence (n), is the second estimated symbol ($\hat{s}'^{(n-1)}{}_k$) obtained for this signal at the previous sequence.

Claim 15 (Previously Presented): Multi-user detection method according to Claim 2 or 8, wherein the reference value ($q^{(n)}{}_k$) for a transmitted signal, used at the second sequence or at a subsequent sequence (n), is a combination of the first estimated symbol ($\hat{s}^{(n)}{}_k$) obtained for this signal at the current sequence and of the second estimated symbol ($\hat{s}'^{(n-1)}{}_k$) obtained for this signal at the previous sequence.

Claim 16 (Previously Presented): Multi-user detection method according to one of Claims 1-4 and 8-9, wherein at the second sequence and at the subsequent sequences, the coefficients of the first plurality of a sequence are initialised from the values of coefficients of the first plurality of the previous sequence.

Claim 17 (Previously Presented): Multi-user detection method according to one of Claims 1-4 and 8-9, wherein the users are classified in order of received power and the interference is eliminated by subtracting, one after the other, the contributions of the different users, commencing with the users with the highest received powers.

Claim 18 (Currently Amended): Multi-user detection method according to Claim 17, wherein for each sequence of a ~~user~~ transmission channel (k), the coefficients ($b_{\ell,i,k}$) of the first set of the first plurality are initialised by $b_{\ell,i,k}(0)=\delta(\ell-\ell o),\forall i$ where δ is the Dirac symbol, ℓo is an antenna number;

and the coefficients ($c_{i,k}$) of the second set of the first plurality are initialised by $c_{i,k}(0)=c,\forall i$ where c is a given complex coefficient.

Claim 19 (Currently Amended): Multi-user detection method according to Claim 17, wherein for each sequence of a ~~user~~ transmission channel (k), the coefficients ($b_{\ell,i,k}$) of the first set of the first plurality are initialised by $b_{\ell,i,k}(0)=\exp(-j(\hat{\nu}_{i,k}(0)+2\pi d/\lambda \cos\hat{\theta}_{i,k}(0).(\ell-1)))$ and the coefficients ($c_{i,k}$) of the second set of the first plurality are initialised by $c_{i,k}(0)=\hat{a}_{i,k}(0)$ where $\hat{\theta}_{i,k}(0)$, $\hat{\nu}_{i,k}(0)$, $\hat{a}_{i,k}(0)$ are respectively estimations of the directions of arrival, phase rotations and coefficients of attenuation for the different paths.

Claim 20 (Currently Amended): Multi-user detection method according to Claim 17, wherein for each sequence of a ~~user~~ transmission channel (k), the coefficients ($b_{\ell,i,k}$) of the set of the first plurality are initialised by $b_{\ell,i,k}(0)=b\cdot\delta(\ell-\ell o),\forall i$ where δ is the Dirac symbol, ℓo is an antenna number and b a given complex coefficient.

Claim 21 (Currently Amended): Multi-user detection method according to Claim 17, wherein for each sequence of a ~~user~~ transmission channel (k), the coefficients ($b_{\ell,i,k}$) of the set of the first plurality are initialised by $b_{\ell,i,k}(0)=\hat{a}_{i,k}(0).\exp(-j(\hat{v}_{i,k}(0)+2\pi d/\lambda \cos\hat{\theta}_{i,k}(0).(\ell-1)))$ where $\hat{\theta}_{i,k}(0)$, $\hat{v}_{i,k}(0)$, $\hat{a}_{i,k}(0)$ are respectively estimations of the directions of arrival, phase rotations and coefficients of attenuation for the different paths.

Claim 22 (Previously Presented): Multi-user detection method according to Claim 12, wherein the estimations of the transmitted signals of the users being considered comprise an estimations vector with K components where K is the number of users, and the vector is subjected to a transverse matrix filtering.

Claim 23 (Previously Presented): Multi-user detection method according to Claim 22, wherein the estimated symbols of the users being considered comprise a symbols vector with K components, the symbols vector is subjected to a postcursor matrix filtering, and the output of this filtering is subtracted, vector by vector, from the output of the transverse matrix filtering.

Claim 24 (Canceled).

Claim 25 (Currently Amended): A multi-user detection system for elimination of interference between users, each user transmitting modulated data in the form of symbols on a transmission channel, each transmission channel (k) comprising at least one propagation path (i) and each propagation path arriving at an array of reception antennae (ℓ) according to a direction of arrival ($\theta_{i,k}$), the system comprising:

a receptor configured to decompose each antenna signal into filtered signals ($x_{\ell,i,k}$) issuing from the different paths (i) of the ~~user~~ transmission channel (k) and combining the filtered signals by scaling the filtered signals with a first plurality of coefficients ($b_{\ell,i,k,}c_{i,k}$) in order to form an estimation (z_k) of the signal transmitted by the user;

an estimator configured to estimate the contribution $((x_{\ell,k})\ell=1..L)$, where L is an integer, of the user to the signals received by the different antennae from the estimation of the signal transmitted and a second plurality of coefficients ($u_{i,k}$, $w_{\ell,i,k}$) obtained from the first plurality of coefficients;

said receptor configured to eliminate interference by subtracting from the antenna signals the contribution estimated the estimator in order to obtain cleaned antenna signals;

the cleaned antenna signals configured to be supplied by at least one first sequence being used as antenna signals by at least one second sequence.